



**Golden  
Empire  
Amateur  
Radio  
Society, Inc.**

www.gearsw6rhc.org

"Dedicated to Public Service"

# THE RADIATOR



W6RHC  
IRLP #8170



P.O. Box 202 Chico, CA 95927

February 2021 Newsletter

GEARS Founded August 13, 1939

I'm delighted that COVID vaccines are available in Chico. Some members have already received theirs, others over 65 will get the shot this month. If you haven't signed up yet go to <http://www.buttecounty.net/ph/COVID19/vaccine>

The sooner GEARS members are vaccinated, the sooner we can start holding in person meetings again.

Gene Wright, WA6ZFY is planning to hold an antenna workshop February 21<sup>st</sup> 2pm at the Chico Elks Lodge picnic area. Come on out, it will be nice to see each other. Please wear a face mask for safety.

Field Day will be June 26-27. We have reserved the Masonic Lodge again this year.

GMRS is being is seeing increasing usage for groups such as CERT. GEARS member Stephen McDermott, K6AKF explains GMRS usage and licensing.

I want to thank everyone who paid their GEARS 2021 dues. Your support keeps our club alive.

The GEARS Board of Directors has moved the meeting to Wednesday evenings to better accommodate our busy schedules.

Happy February Birthdays to Members Richard Astley N3UOR, Marc Farley KJ6WEX, Mel Metcalf N6JLX and Jim Van Sickle N7ANG.

I'm looking forward to a better year. I hope to see all of you sometime soon. Take care and stay safe.



'73  
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Join GEARS on Facebook  
[www.facebook.com](http://www.facebook.com) For timely  
news and additional information.

## February 2021 Calendar

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 7pm GARS Net	2 7:30pm GEARS Net	3	4 7pm PARS Net 7:30pm Simplex Net	5	6
7 8pm OARS Net VEC Testing Chico	8 7pm GARS Net 8pm ARES Net	9 7:30pm GEARS Net 7pm ARES meeting	10	11 7pm PARS Net 7:30pm Simplex Net	12 7pm GARS & OARS Meetings	13
14 8pm OARS Net	15 7pm GARS Net 8pm ARES Net	16 7:30pm GEARS Net	17 GEARS Board Mtg.	18 7pm PARS Net 7:30pm Simplex Net	19 7pm GEARS Meeting online	20
21 8pm OARS Net 2pm GEARS Antenna Workshop	22 7pm GARS Net 8pm ARES Net	23 7:30pm GEARS Net	24	25 7pm PARS Net 7:30pm Simplex Net	26	27 9am OARS Breakfast
28 8pm OARS Net						

**VEC Testing**, FCC License Exam available by appointment. For information or registration call Tom Rider, W6JS 514-9211

**Chico Breakfast** Canceled until things settle down with the COVID-19 virus.

**GEARS Board Meeting** 2nd Saturday online.

**OARS Meeting** Second Friday of the month, TBD (To Be Determined)

**GARS Meeting** Second Friday of the month, TBD

**Butte ARES Meeting** 3rd Tuesday, TBD Contact Dale Anderson, KK6EVX 826-3461 for more information.

**GEARS Meeting**, third Friday of the month, online till further notice pm, meeting at 7:00 pm.

**OARS Breakfast** 4th Saturday of the month TBD

### NETS:

OARS Club Net Sunday 8pm 146.655 Mhz - PL 136.5

GARS Club Net: Monday, 7:00 pm 147.105 MHz + PL 110.09

Butte ARES Net Mondays 8pm 145.290 MHz - PL 110.9

Yuba Sutter Club Net Monday 7pm 146.085 MHz + PL 127.3

GEARS Club Net Tuesdays 7:30 PM 146.850 MHz - PL 110.9

PARS Club Net Thursday 7pm 145.290 - PL 110.9

Simplex Net Thursday 7:30 p.m. 146.52 no tone

Yuba Sutter ARES Net Thursdays 7pm 146.085 MHz + PL 127.3

Sacramento Valley Traffic Net Nightly 9:00 PM 146.850 MHz - PL 110.9

## GEARS Repeaters

GEARS West on St. John

145.410 MHz PL is 123.0 Negative offset.

PL both input and output (CTSS)

GEARS East in Forrest Ranch

146.850 MHz Negative offset. PL 110.9 CTSS

440.650 MHz Plus offset, PL 110.9 Hz



## 2 Meter Slim Jim Antenna Workshop

Gene Wright, WA6ZFY is planning to hold an antenna workshop February 21<sup>st</sup> 2pm at the Chico Elks Lodge picnic area. Please bring and wear a face mask!

The Slim-Jim is a great performer and when made from a length of spare 450-ohm ladder-line – not only a cheap project but something that offers great bang-for-buck in terms of what it does. Plus, of course, the satisfaction of having built it yourself.

This antenna is easy and simple to build. Plus it will be fun to build with other hams.

The Slim-Jim makes a great temporary aerial for use in a hotel room, perhaps hanging from a curtain rod. It's also perfect for camping, since you can just hang it from a tree. It also works great when placed up a non-conductive pole (like a telescopic fishing pole).

The Slim-Jim antenna has about 6Dbi of gain, twice that of a J-Pole. It also features a wider bandwidth than a J-Pole.

Gene has a few feet of 450 ohm ladder-line, if you have some please bring it. You'll also need a length of coax and the connector used with your radio. Some handhelds use BNC, most newer ones use SMA connectors. Note if your radio requires male or female SMA. You can buy a length of coax with a connector already attached. Check eBay or Amazon for SMA Male to Female cable. This way you'll have both male or female depending on which you need. Get the length you want.

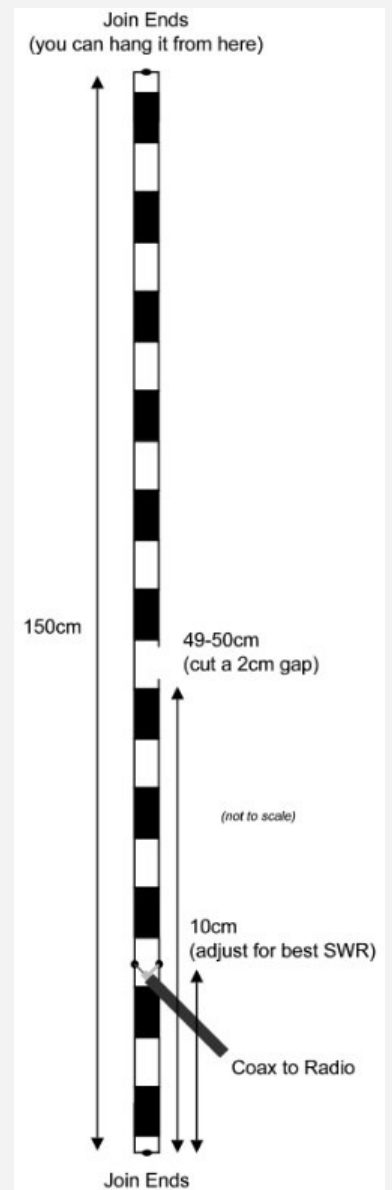


Also bring some tools if you have them: a pocket knife, wire strippers, pliers, soldering iron, and solder.

Come out and join us on the 21<sup>st</sup>. It should be fun.

For more information call Gene 519-2519

Also see this article for plans and information: <http://www.m0pzt.com/slimjim/>



FACE MASKS REQUIRED FOR SAFETY !!!

### GEARS Century Members

Susan Check  
Kent Hastings  
Bennett Laskey  
Tony Nasr

*We thank these members for their extra support.*

### GEARS 2021 Dues

If you haven't already done so, please pay your GEARS 2021 Dues. Your contribution covers operating costs of our three repeaters, helps support ARES and helps keep amateur radio alive in this area. Dues are \$20, or \$30 for supporting membership. If you are able to contribute more you can choose a Century membership of \$100.

You can now pay online by PayPal at: <http://paypal.me/w6rhc>

# GMRS

By Stephen McDermott, K6AKF

## What Is GMRS?

The General Mobile Radio Service (GMRS) is a licensed radio service that uses channels around 462 MHz and 467 MHz. The most common use of GMRS channels is for short-distance, two-way voice communications using hand-held radios, mobile radios, and repeater systems. The Family Radio Service (FRS) is also inter-mixed with in the GMRS frequencies.

The GMRS is available for short-distance two-way communications to facilitate the activities of licensees and their immediate family members. Each licensee manages a system consisting of one or more transmitting units (stations.) The rules for GMRS limit eligibility for new GMRS system licenses to individuals to make the service available to personal users.

In 2017, the FCC updated the GMRS by allotting additional channels in the 462 to 467 MHz band, allowed transmission of limited data applications such as text messaging and GPS location information and made other updates to the GMRS rules to reflect modern application of the service.

## GMRS Licensing

An FCC license is required to operate GMRS system. Licenses are issued for a 10-year term and can be renewed between 90 days prior to the expiration date and up to the actual expiration date of the license. After a license expires, an individual must request a new GMRS license.

The FCC has just approved new license fees for the GMRS. According to the FCC Report and Order released December 29, 2020, the application fee for a GMRS license was \$70. The new GMRS license fee, \$35 is still under consideration by the FCC and when initiated covers all family members.

A GMRS licensee may use a combination of portable, mobile, fixed and repeater stations consistent with the operational and technical rules in Subpart E of Part 95. The use of some channels is restricted to certain types of stations and certain channels are reserved for voice-only operations.

## Applicant Requirements

- Applicants age must be over 18.
- Not a representative of a foreign government.
- Only available to individuals.
- No exam
- If you have been convicted of a felony in the past, you will need to disclose more as the context of the charges. This does not mean you will automatically be denied. Follow the rules set forth by the FCC.

None of the GMRS channels are assigned for the exclusive use of any system. You must cooperate in the selection and use of the channels to make the most effective use of them and to reduce the possibility of interference. You can expect a communications range of five to twenty-five miles with a fixed base system. In transient use, a mobile station in a vehicle can communicate through GMRS repeaters with the permission of its licensee.

## Obtaining Your GMRS License

It is actually a two-part process. Below are the steps: 1. You first need to obtain an FCC Registration Number (FRN). Go to this website <https://apps.fcc.gov/coresWeb/publicHome.do>

Click on the "REGISTER" button. On the next page, answer the two questions (you are registering as "an individual" and "YES" you are located in the United States.). Then click on the "Continue" button.

On the next page, complete all of the requested information (Name, address, SS#, password, personal security question, etc.). Make sure you record your password you will need it to apply for your license. Then hit the "Submit" button.

You will then be issued your FRN number. Please print and save this page or otherwise record the FRN

2. Second, go to the FCC License Manager website by copying and pasting this link into your browser:

<https://wireless2.fcc.gov/UlsEntry/licManager/login.jsp>

Enter your FRN number and password and hit the "Submit" button. a) On the next page in the left-hand column, select "Apply for a New License". Under "Select Service", choose "ZA – General Mobile Radio (GMRS)" from the scroll down menu options (it is the choice at the very bottom of the list). Then click on the "Continue" button.

On the next page, all three of the questions should be answered "No". Then click on the "Continue" button. c) On the next page, complete all of the requested information under "Name and Address". Then click on the "Continue" button.

On the next page, answer the question "No" (assuming you have not been convicted of a felony). Then click on the "Continue" button.

On the next page under "Summary", review all of the information and ensure it is correct. Then click on the "Continue To Certify" button.

On the next page under "Certification", scroll to the bottom of the page and enter your name the same way you entered it previously on the application. Under "Title", enter "Individual". Then click on the "Submit Application" button.



You should receive a "Confirmation" page. You should print and save this page or otherwise record the File Number. Scroll to the bottom of the page and then click on the "Continue For Payment Options" button.

You will now be presented with the "Electronic Form 159" which is used to make a payment for the \$70 License Fee. There are three Login options to the payer system. Select the one on the far right in which you will use your FRN number and password.

You will be presented with four different "Payment Methods". Select the one which is most convenient for you. Paying by a bank account electronic debit or a credit card may be the easiest and most efficient because they can approve your payment quickly and start processing your license application.

If you select one of these methods, you will be directed to the US Treasury's Pay.Gov System. Complete the requested information and then click on the "Continue with Plastic Card Payment" button.

You should receive a confirmation that your payment was successful, and your application will be processed. It will take about a week to ten days for them to issue your license.

You should receive an email notifying you that it has been issued. Once received, you can go back to the FCC License Manager website, that is the second link that you clicked on; enter your FRN & password, the system will display your file with your license call sign.

If you have any questions, please do not hesitate to contact Mike Zink either by phone 415-479-0378 or email [MikeZink86@comcast.net](mailto:MikeZink86@comcast.net)

Next month will be FRS & GMRS frequency allocations.

*Stephen McDermott, K6AKF has been a GEARS member for over 40 years. Stephen lost his home in the camp fire and now has a home in Chico.*

## **THOSE WILD HAMS OF THE 1920'S**

**MADE THEIR OWN COMPONENTS - WERE CONFINED TO BELOW 200 METERS - DIDN'T TAKE FCC EXAMS**

BY CHARLES C. HAY, W0LCE published in Popular Electronics October 1973

It was a glorious time to live back in the 1920's, when radio communication was just beginning to emerge. Only a very few top scientists knew anything about this new medium and most of the things they "knew" were incorrect. But that didn't deter them from displaying their errors what they thought were "facts" in the public press.

One of the notable "facts" that got around was the statement that radio communication was impossible below a wavelength of 200 meters. (For those of you familiar with only hertz, 200 meters is 1500 kHz.) So, Congress dreamed up a radio law that confined all amateur communication to the bands below 200 meters-or above 1500 kHz.

The law also specified that all radio stations had to be licensed. Little problem that, since a license was granted upon request and without the applicant having to submit to an examination.

Another part of the law stipulated that only in the big cities were licenses to be granted. Needless to say, since many experimenters lived a long way from the big cities, a lot of transmitters were on the air without the benefit of licenses. Whatever call letters were used were self-assigned.

All of the equipment we early hams used was homemade. There were only two companies in the entire United States that sold radio parts, and their prices were quite steep. For example S20 would buy a link coupler, while a variable condenser (now called capacitor) went for \$15. So, most of us were forced to build our own equipment. The usual receiver consisted of a coil of wire wound around an empty oatmeal box another coil inside the box was rotated by a lead pencil pushed through the box and both coils. This pair of coils was connected to a fine wire sharpened to a point. The point made contact with the surface of a galena crystal. The body of the crystal was connected to one lead of a pair of headphones, and the other lead of the phones was connected to ground. With a long enough length of wire for the antenna, this contrivance could receive radio signals from as far away as 1000 miles. It needed no outside power since all the power was furnished by the radio waves themselves.

While vacuum tubes were known in the early 1920's (they were used in World War I), they weren't available, except to a very few lucky individuals. Everyone used a tubeless spark transmitter, anyway. A spark transmitter was easy to build. It required simple materials, like a spark coil from a Ford T Ford, a pair of sharpened zinc strips (to act as the spark gap), a telegraph key, and an antenna. By connecting the spark coil through the telegraph key to an automobile battery, and the secondary of the coil through the spark gap to the antenna a guy was in business. When he pressed the key, he drew a lovely spark from the gap. The spark could be received clear across town, if the town wasn't too big, that is.

Although the receiving station had a tuner it wasn't really necessary. Those spark transmitters were the original all band transmitters. When they came on the air, any nearby receiver, no matter where tuned, would pick them up.

Late in the 1920's, vacuum tubes became available. About the same time, commercial broadcasting reared its head. People with money could buy broadcast receivers, precipitating the unpopularity of the neighborhood experimenter with his all wave spark transmitter.

Government regulations, which instituted "silent hours" for Sunday mornings and until 10 o'clock each evening, came into effect. Not that this did much to the experimenter. He usually didn't read government publications, so he knew nothing of the regulations.

At the time the new regulations came into effect, radio communication was administered by the Department of Commerce, which had other things to do besides supply money for radio enforcement. With the absence of enforcement, the young radio experimenter wasn't much troubled. But there were neighborhood relations to consider, and if interference was overdone, the neighbor with his high-priced broadcast set was likely to take the matter up with the offender's parents. This usually resulted in the enforcement of "quiet hours" if it didn't terminate experimentation altogether.

I was one of the experimenters in the early days of amateur radio. The fact that I could hear broadcasts on my crystal detector tuner intrigued my parents to the point where they shelled out enough money for a vacuum tube, a Crosley book condenser and a variable tuner. With these treasures on hand, I was able to build a new-fangled super-regenerative receiver. A byproduct of my new receiver was the fact that the super-regenerative was itself a transmitter. It interfered mightily with our neighbor's receiver. But that was a problem between my parents and the neighbor.

The super-regenerative would pick up commercial broadcasts. It was also adept at picking up amateur transmissions (after my parents had gone to bed, of course). By this time, amateur operators had acquired vacuum tubes. Some of them were even communicating via voice (phone)!

My desire for a tube transmitter could be described as a "consuming passion." But while my parents were deeply interested in broadcasting, the idea of an amateur radio transmitter in the same house left them cold. No money was forthcoming. I had read of a Chicago ham who had built every part of an amateur radio station. He even built the vacuum tube. So, I thought, anything he could do, I could do.

Building the vacuum tube, however, was the big problem. Vacuum tubes grew from Mr. Edison's incandescent lamp. They were large and had four-pronged bases. Making the base was beyond my powers. Fortunately, one of the broadcast set dealers I happened to visit showed me a receiver made in Canada. It used Myers tubes. While the American tubes were descended from a light bulb, the Myers tube was fathered by a cartridge fuse. Now, this was something I could duplicate. I bought a test tube and from it cut away the lip and closed end. To the body of this 2-inch-long glass cylinder. I fused a length of 11-inch glass tubing over a hole made previously. Then after rolling a strip of copper into a cylinder and soldering to it a length of heavy wire, I slipped the assembly into the glass tube. Next I wound a coil of wire, much smaller in diameter than the inner diameter of the copper cylinder, soldered to it a length of wire, and slipped the new assembly into the copper cylinder. When I was finished with this step, the wires from both assemblies protruded from opposite ends of the glass tube.

Recovering a length of filament wire from a light bulb, I slipped this down the center of the coiled wire. After using rubber stoppers to seal both ends of the glass tube (with the wires protruding, of course), I applied sealing wax to assure an airtight seal. Later, at school, I attached a rubber hose to the 3.1-inch glass tube and used a vacuum pump to evacuate the air until the rubber tubing went flat. The only thing left was to use a blow pipe to seal the 11-inch glass tubing. My first vacuum tube had the filament wire exiting from it through the centers of the rubber stoppers. When power was applied to the filament, it heated up as expected and so did the stoppers. The vacuum left the tube with a piercing shriek, and a strong smell of burning rubber filled the air.

My next vacuum tube produced better results. Instead of having the heater wire exit the tube, a pair of copper wires, crimped around the heater wire, did the exiting, and all the heat was contained within the tube. This arrangement functioned quite well. In fact, I had three QSO's using the tube before the vacuum got up and slowly walked away.

There were other components we early hams had to make by hand. Some were easy to make, like tubular bypass condensers. Back then, Hershey chocolate bars were wrapped in real solderable tin foil. This foil, some waxed paper, copper wire, and a soldering iron and solder were all an experimenter needed to make his own condensers. To make the condenser, we would cut two pieces each of tin foil and waxed paper to 4 inches by 1 inch. After lightly tacking soldering leads to the short edges of the foil, the waxed paper and foil sheets were interleaved with overhangs to obviate any possibility of the plates (or leads) from touching each other when the condenser was assembled. Then the whole was tightly rolled into a cylinder. When finished, the condenser had one lead coming out of the center of the cylinder and one lead to one side. After bending the side lead to line up with the center, the foil was crimped around the leads and soldered. A bit of sealing wax over the soldered foil and along the exposed seam of the waxed paper properly sealed the condenser. A strip of adhesive

tape held the whole thing together. A variable condenser also had to be hand made. The Crosley book condenser didn't have enough insulation resistance between its plates. So, 4 inch square pieces of sheet zinc were cut and fitted into every other sawed groove ill a pair of pine guides. An end piece which had sawed grooves that mated with the empty ones in the other assembly had fastened to it the rest of the zinc plates. When the two were meshed, we had a crude variable condenser.

Resistors were more of a problem. The carbon cores from flashlight batteries could be used, but they were rather limited in their resistance. Even when a number of them were connected ill series, the resistances obtained were often unsatisfactory. Nor could the resistance be controlled. The way to go was to insert a couple of copper wires through a rubber cap into a bottle half filled with water and change the resistance by varying the depth of the wires in the water. Excitement was added when the water boiled during a transmission.

The power supply was more difficult to make. Hams with lots of money had motor generators to supply their power. Most of us, however, had to find another means of obtaining power. For example, I took a number of copper plates, about 4 inches square, and oxidized one side of each with a blow torch. I drilled a hole through the center of each plate, and, after slipping a rubber tube around a long bolt and insulating the head and nut with rubber from an old inner tube, put the bolt through the stack of plates. When finished, the plates were bolted together, oxidized face to bare copper. This rectifying setup, with a couple of my home-made bypass condensers and the coil from an old telegraph sounder made a 117 volt plate power supply.

Finally, there came that magic night when my parents were in bed safely asleep. I crept downstairs and assembled the set with a galena crystal where the tube would be. With the headphones tightly over my ears, I moved the variable condenser until I heard another amateur. Then I quickly tuned him in on the super-regenerative. Taking the galena crystal out and inserting the tube, I fired up my rig and gave him a call. I was lucky. He came back to me, and that was my first QSO, the high point of my life.

The QSL card I received from him still hangs on my shack wall, some five decades after it was sent.

#### GEARS Club Officers:

President.....Jim Matthews, K6EST  
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Secretary.....Open  
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GEARS Radiator past issues are available at:

<https://drive.google.com/drive/folders/0B-jPu0P0RkymZ2Q1WDR6THZLNmM?usp=sharing>

